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THE PLATFORM OF THE FORESTER

In order that the good will of its readers may become as effective as possible in aiding to solve our present forest problems, the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey conjointly, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.
2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.
3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.
4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.
5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will here find lines of work suggested, along which every effort will tell. No opportunity for doing good along these lines should be neglected.

J. A. ALLEN, *Editor.*

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VIRGIN REDWOOD NEAR CRESCENT CITY.

THE FORESTER.

VOL. VII. FEBRUARY, 1901. NO. 2.

PHILIPPINE FOREST PRODUCTS.

BY F. F. HILDER.*

IT has been estimated that the forests of the Philippine Islands cover an area of about 40,000,000 acres. The island of Mindanao with an area of some 20,000,000 acres has immense tracts of almost unbroken forest. The same is true with regard to the islands of Mindoro and Palawan and even in Luzon, the most densely populated island of the group and where most timber has been cut, there still exist millions of acres of virgin forest. The forests will prove to be among the greatest resources of these beautiful and fertile islands and, if the disposition of the timber is judiciously managed by the government, sufficient can be cut, without destroying the forests, to provide funds for many much-needed public improvements, and to recompense the United States for the great military and other expenditures. Much of this can be done with absolute advantage to the forests, as millions of cubic feet of timber should be cut in order to thin the dense growth so that the maximum annual growth of the trees can be obtained. One peculiarity about these forests is that there are no great areas covered by any one species of tree, so that to accumulate a cargo of one kind of timber it must be assembled from different localities. There are many reasons why large capital will be required to carry on a successful timber trade in these islands, but with sufficient means there is no commercial venture that will yield more remunerative profit.

It is not definitely known how many different species of trees exist in the Archipelago, but the number is probably from 400 to 500, of which a large proportion are hardwoods. In the following list I have included the best known varieties with such information respecting them as I have been able to gather.

---

* Frank Frederick Hilder was born in Hastings, England, in 1836, and died in Washington, January 21, 1901. He was educated at Rugby, and after going through the military school at Sandhurst entered the army and began service in the Sepoy rebellion. He was awarded the Indian Mutiny Medal with special-service bars for Delhi and Lucknow. Later he saw service in Farther India, Borneo, the Philippines, and Africa, won the Egyptian Medal, and was promoted to a Colonelcy at the express request of the Khedive. A sand storm so injured his eyesight that he gave up the idea of a military career and came to this country, where he did special work of importance in the Engineer Corps during the Civil War, but declined an American commission. Colonel Hilder then went into business, but after being ruined several times by fire he gave himself up entirely to research and publication. During his military service and his business life he had traveled over a great deal of Asia, Africa and South America, and had always made the most of his opportunities for ethnologic and geographic research. During the year ending in June, 1899, he acted as Secretary of the National Geographic Society, and afterwards became Ethnologic Translator in the Bureau of American Ethnology. During the earlier half of 1900 he was detailed to the Philippines as special agent of the Pan-American Exposition.

Colonel Hilder contributed this article to the FORESTER shortly before his death. The editor makes grateful acknowledgements for help in reading the proof to Mr. G. B. Sudworth and to the officers of the Bureau of American Ethnology.

Common name.	Botanical name.	Description.	Localities where found.
Alintatao	Diospyros sp.	Several other varieties of the order Ebenacæ are found on the islands, such as Ebano, Sapots and Camagon. Alintatao is a hardwood which has been used for furniture, framing, roofs, etc., but it is brittle, not very plentiful, and is now not much used.	Provinces:* Tayabas Camarines Sur.
Bolongita	Diospyros pilosanthera	Wood clouded red in color, very similar in appearance to Camagon; used in house construction.	Provinces: Zambales, Morong, Infanta, Batangas. Islands: Mindoro, Balabac.
Camaynan	Diospyros sp.	A wood of close texture, dark red in color. It was formerly much used in house building, but it is very liable to attacks of insects, which has led to disuse.	Provinces: Bataan, Laguna. Island: Leyte.
Ebano	Diospyros ebenum	The Ebony of commerce; found only of small size and in limited quantities. Used exclusively for fine cabinet work.	Provinces: Cagayan, Principe, Infanta, Batangas, Albay. Islands: Masbato, Mindoro, Romblon.
Malapapay	Diospyros sp.	Hard wood, black and red in color, very similar to Camagon and used for same purposes.	Provinces: Cagayan, Lepanto, Benguet, Principe, Laguna, Infanta, Batangas, La Union, Ilocos. Islands: Mindanao Negros, Romblon, Masbate.
Anobing	Artocarpus ovata	Not much appreciated as a hard wood, but resists damp well; used for pillars or supports of houses.	Provinces: Nueva Ecija, Bataan, Laguna.
Antipolo	Artocarpus incisa	Yellowish in color, light, very strong; is resistant to attacks of the teredo, does not warp when seasoned, is much used for outside planking and keels of ships, and also for flooring. A very valuable wood.	Provinces: Nueva Ecija, Bataan, Laguna, Infanta, Batangas, Camarines Sur. Islands: Masbate, Romblon.
Acle	Xylia sp.	Can be obtained in large logs. Wood dark red in color, strong and durable; it is difficult to burn, polishes well, and is of fine grain. It has been called the Walnut of the Philippines, is much used in house and ship building, and is highly prized by the natives	Provinces: Nueva Ecija, Zambales, Bataan, Pampanga, Bulacan, Laguna, Infanta, Cavite, Camarines Sur. Islands: Mindoro, Romblon.
Amuguis	Odina sp.	Close-textured, solid wood, reddish in color, used for flooring or planking; abundant. That from Bataan is considered the best quality.	Provinces: Tayabas, Nueva Ecija, Laguna, Cavite, Batangas, Bataan, Zambales, Camarines Sur. Islands: Masbate, Mindoro, Romblon.
Anagap	Pithecolobium	Light durable wood used for interior fittings and furniture; does not bear exposure.	Provinces: Laguna, Batangas, Cavite, Nueva Viscaya.
Apiton	Dipterocarpus	Logs can be obtained 60 to 70 feet long by 24 inches square. A light wood, works well, serves for furniture and general carpentry.	Provinces: Nueva Ecija, Laguna, Tayabas, Zambales, Camarines Sur, Pampanga. Islands: Mindoro, Palawan, Panay.
Banuyo	Dipterocarpus sp.	Logs 20 to 40 feet long by 12 inches up to 30 inches square similar to	Provinces: Nueva Ecija, Zambales, Bataan,

* Provinces—*i. e.*, provinces of the island of Luzon.

Common name.	Botanical name.	Description.	Localities where found.
		Acle but much lighter. Used for carpenter work in general.	Pampanga, Laguna, Infanta, Cavite. Islands: Mindoro, Romblon.
Lauan	Dipterocarpus thurifera	A light wood, easily worked, but is very liable to destruction by the white ant. A resinous balsam and incense is obtained from this tree.	Provinces: Albay, Bataan, Luguna, Nueva Ecija. Islands: Masbate, Mindoro, Leyte, Bohol.
Panao	Dipterocarpus vernicifluus	A resinous gum which is used for making varnish is obtained from this tree. After the resin has been extracted the wood is of little use as it is destroyed by white ants.	Provinces: Bataan, Manila, Infanta, Camarines. Island: Samar.
Aranga	Homalium	Logs can be obtained up to 75 feet long. A close-grained wood used for sea piling and all kinds of marine work subject to attacks of the teredo.	Provinces: Camarines Sur, Batangas, Tayabas, Isabela, Nueva Ecija. Islands: Mindoro, Palawan.
Batitinau	Lagerstroemia	Produces logs 35 to 40 feet by 18 inches. Fine grain, dark color, very strong, tough and elastic. Stronger than teak and used for planking ships and for furniture, where it is a good substitute for Black Walnut.	Provinces: Bulacan, Camarines Norte, Albay. Island: Mindoro.
Banaba	Lagerstroemia flos-reginæ	Wood dark red, strong, tough and useful, requires thorough seasoning. Much used for ship building and all kinds of carpentry. Abundant.	Provinces: Cagayan, Ilocos Norte, Ilocos Sur, Abra, Boutoc, Lepanto, Benguet, Nueva Viscaya, Nueva Ecija, La Union, Principe, Pangasinan, Bataan, Pampanga, Infanta, Cavite. Islands: Mindoro, Panay, Palawan, Balabac.
Bancal	Nauclea glaberrima	Wood yellow in color, easy to work; it is used in boat building, for casks and for general joiner's work; that from Mindanao is closest-grained and is considered the best.	Provinces: Isabella, Nueva Ecija, Principe, Zambales, Pampanga, Cavite, Tayabas. Islands: Mindoro, Romblon, Mindanao.
Bansalague	Mimusops sp.	Yields logs 40 to 45 feet long by 18 inches compact, close-grained, used for handles of axes and other tools, useful for turning.	Provinces: Cavite, Bataan, Pampanga, Pangasinan, Camarines Sur, Bulacan.
Betis	Payena sp.	Logs up to 60 feet long by 20 inches square. Wood brownish red in color. Used in ship building, marine construction, piling, etc., as it is proof against the teredo. It is now not very plentiful unless some of the unexplored forests many yield fresh supply.	Provinces: Isabella, Nueva Ecija, Bataan, Tayabes. Islands: Mindoro, Mindanao, Romblon.
Palo-Maria	Calophyllum tacamahaca	A strong tough wood, not so heavy as Molave; used in shipbuilding as its oily resin preserves iron bolts driven into it. The natives extract a balsam from it called Balsamo de Maria and use it for medical purposes.	Provinces: Cagayan, Ilocos, Principe, Nueva Ecija, Zambales, Pangasinan, Camarines, Albay. Islands: Masbate, Balabac.
Bitoc	Calophyllum sp.	Wood reddish in color, close-grained and compact, used to some extent in joiner's work but is not very plentiful.	Province: Nueva Ecija.
Baticulin	Stereospermum sp.	Wood yellowish white; easily worked; used largely for interior	Provinces: Ilocos Sur, Principe, Zambales, Ba-

Common name	Botanical name.	Description.	Localities where found.
		decorative work, ceilings, wood carving, etc. It is considered proof against attacks of insects. Abundant.	taan, Morong, Laguna, Infanta. Islands: Samar, Leyte.
Cedro or Calantas	Cedrela odorata	The Cedar of commerce, largely used for cigar boxes, also for boats and canoes. It is abundant and logs of all dimensions are obtainable. Found in all the islands, but more particularly in the districts named.	Provinces: Abra, Ilocos Norte, Ilocos Sur, Bontoc, Lepanto, La Union, Benguet, Nueva Ecija, Nueva Viscaya, Zambales, Bataan, Bulacan, Morong Infanta, Camarines. Islands: Mindoro, Romblon, Palawan, Balabac.
Camagon	Maba sp.	A close grained but somewhat brittle wood. Dark red and black, with broad yellowish streaks. Used for fine furniture Plentiful. It is closely allied to ebony in its qualities.	Provinces: Cagayan, Ilocos Sur, Lepanto, La Union, Benguet, Nueva Viscaya, Nueva Ecija, Principe, Laguna, Infanta, Batangas. Islands: Masbate, Romblon, Negros, Mindanao.
Calamansanai	Terminalia sp.	A compact wood, strong but brittle, does not bend well; used for construction and floors.	Provinces: Laguna, Nueva Ecija, Pampanga. Islands: Mindoro, Mindanao.
Calumpit	Terminalia bellerica	A dark yellow wood not much in use except for masts and spars of small native vessels.	Provinces: Bataan, Nueva Ecija, Pampanga, Bulacan, Cavite.
Dongon	Heritiera tinctoria	Large trees giving logs 50 feet by 20 inches; wood very hard and durable, color dark red. It is used for keels of ships or for any purpose which requires resistance to weight and pressure, but does not well withstand attacks of the teredo or white ant.	Provinces: Cagayan, Ilocos Norte, Ilocos Sur, Isahela, La Union, Benguet, Nueva Viscaya, Principe, Zambales, Bataan, Bulacan, Manila, Morong, Batangas, Camarines, Albay. Islands: Mindanao, Balabac, Romblon, Bohol, Leyte.
Ipil or Ypil	Afzelia sp.	A strong hard timber, dark in color, which grows blacker with age. It is obtainable in logs up to 70 feet by 24 inches. It is used the same as Molave and has all its qualities except that it does not resist the teredo. It is much esteemed for its power of resisting damp in underground construction.	Provinces: Cagayan, Abra, Boutoc, Lepanto, Isahela, Nueva Ecija, Pangasinan, Zambales, Morong, Batangas. Islands: Masbate, Mindoro, Romblon, Panay, Negros, Cebu, Samar, Mindanao, Balabac, Bohol.
Lanutan	Anona	Wood brown in color. It was used by the Spanish ordnance department for gun stocks. It is also used to some extent in carpentry.	Provinces: Bataan, Pampanga, Infanta, Tayabas. Islands: Mindoro, Cebu, Balabac.
Lanete	Wrightia sp.	A white wood, can be obtained in logs from 20 to 25 feet by 18 inches. Used for wood carvings, musical instruments, turning and cabinet work.	Provinces: Bataan, Morong, Laguna, Batangas, Nueva Ecija, Camarines. Islands: Panay, Leyte, Bohol.
Molane	Vitex geniculata	A very valuable wood which compares favorably with American and European Oak. Obtainable in logs 30 to 35 feet long and up to 30 inches square. It is used for piles, construction of houses, railway ties and naval	Provinces: Abra, Bontoc, Lepanto, Ilocos, Cagayan, Isahela, La Union, Benguet, Principe, Nueva Ecija, Zambales, Bataan.

Common name.	Botanical name.	Description.	Localities where found.
		construction. Neither moisture, heat, teredo nor white ants affect it. It is practically everlasting and is held in highest esteem by the natives. It is yellowish in color. An inferior species of this tree called female Molave grows in low marshy ground. Its color is whiter and it is not so strong.	Islands: Mindoro, Romblon, Panay, Negros, Cebu, Mindanao, Samar, Leyte, Bohol.
Mangasinora	Fagræa sp.	Has a yellow wood often confounded with Maugachapuy and is frequently used in substitution for that wood.	Provinces: Cagayan, Bataan, Bulacan, Albay, Tayabas. Islands: Mindoro, Romblon, Panay, Cebu, Mindanao.
Macasin	Eugenia sp.	Is often used as a substitute for Banaba when that wood is scarce. Dark in color; used for interior carpentry, floors, etc.	Provinces: Cagayan, Abra, Boutoc, Lepanto, Bataan, Pampanga, Cavite, Infanta. Islands: Mindoro, Panay, Palawan, Balabac.
Málarujad	Eugenia cymosa	Hard, reddish brown in color, not much used.	Provinces: Principe, Zambales, Nueva Ecija, Bulacan, Manila, Laguna, Infanta, Cavite. Islands: Mindoro, Romblon.
Mancono	Xanthoxylum sp.	A very hard wood similar to Lignum-vitae.	Islands: Mindanao, Mindoro, Leyte, Cebu, Bohol.
Maugachapuy	Shorea sp.	Very similar to Guijo, can be obtained in logs 50 feet by 20 inches; yellowish in color. It is used in house construction, for masts and decks of ships, and for all work exposed to sun and rain. Is quite elastic and very durable.	Provinces: Cagayan, Pangasinan, Bataan, Bulacan, Camarines, Albay. Islands: Mindoro, Romblon, Panay, Negros, Cebu, Mindanao.
Guijo	Shorea sp.	Strong, tough and elastic; gives logs up to 70 feet by 24 inches; used in naval construction, also for carriage wheels and shafts, reddish in color. It is not much used in buildings as it is liable to attack of white ants.	Provinces: Isabela, Zambales, Pangasinan, Bataan, Pampanga, Bulacan, Manila, Cavite, Tayabas, Camarines, Albay. Islands: Mindoro, Romblon, Panay, Negros, Leyte, Samar.
Narra (colorado)	Pterocarpus santalinus	Can be obtained in logs 30 to 40 feet by 24 to 30 inches square—dark red in color, very similar to mahogany in appearance. It is used for furniture and was formerly much used in house building, but it is now considered too valuable for that purpose. It is widely diffused over the islands, but has been cut so extensively that it is now found principally in the interior of the forests.	Provinces: Cagayan, Ilocos, Abra, Lepanto, Isabela, Benguet, La Union, Principe,, Nueva, Ecija, Nueva Viscaya Pangasinan, Zambales, Pampanga, Laguna, Tayabas, Camarines. Islands: Masbate, Mindoro, Romblon, Panay, Mindanao, Balabac.
Narra (blanca)	Pterocarpus indicus	Very similar to the red Narra, but not so dense and lighter in color, and not so highly valued. Found in the same localities.	

Common name.	Botanical name.	Description.	Localities where found.
Palma-brava	Corypha sp.	A species of palm which grows to great height. The heart yields a black wood, which is practically indestructible under water. It is largely used by carriage makers in Manila on account of its great flexibility.	Grows in nearly all the provinces of Luzon and all the islands of the Archipelago.
Supa	Sindora sp.	A wood very similar to Ypil and having many of its qualities but generally whiter in color. It can be obtained in logs 50 feet long by 28 inches. It produces an oil. It polishes well and is useful for furniture, house furnishings and general carpentry.	In Mindoro and some of the other islands.
Tindalo	Afzelia rhomboidia	A dark red wood which becomes black with age. It is used for many purposes, particularly for making furniture, as it takes a high polish.	Provinces: Ilocos, Bataan, Bulacan, Cavite, Batangas, Camarines. Islands: Masbate, Mindoro, Romblon, Panay, Negros.
Tangili	Cluytia sp.	A useful wood for general purposes. It is used by the natives of some of the islands for making canoes or dug-outs. It has the drawback of being susceptible of attack from white ants.	Provinces: Zambales, Bataan, Morong, Laguna, Tayabas. Islands: Mindoro, Mindanao.
Zacal	Hopea sp.	Can be obtained in logs 50 feet long by 24 inches square. It is often substituted for Molave. Has great strength and tenacity, is much used for both house and ship building. It completely resists the attack of white ants.	Provinces: Cagayan, Pangasinan, Zambales, Morong, Bulacan, Tayabas. Islands: Mindoro, Samar, Negros, Mindanao.
Tucancola or Tineal	Aglaia	Obtainable in logs up to 30 feet long by 20 inches square. Of superior grain and marking. Adapted for fine carpentry work of all kinds.	Provinces: Cagayan, Zambales, Tayabas, Principe, Bataan, Camarines, Albay. Islands: Mindoro, Mindanao, Romblon, Negros.

The above list of timber-producing trees is intended merely to supply its modicum of information until more complete data may be available.

A forestry bureau was established in Manila, in April, 1900, and Capt. George P. Ahern, U. S. A., has been placed in charge of it. He is an officer of excellent administrative ability, who will without doubt replace the inefficient Spanish forest management with a practical and scientific system of forestry regulations.

In a recent report he states that in his office a work is being compiled describing about fifty of the most important tree species, with colored illustrations of the fruit, flower and leaf of each species, which will be of great value to American botanists and lumbermen, and will of course contain fuller details than I was able to gather in the short time I could spare from other engrossing duties.

In the Zambales mountains, Benguet and other elevated regions there are forests of coniferæ, but the timber is fit for nothing but firewood, as if used for any purpose of construction in lower altitudes it would serve merely as food for white ants. For the same reason the North American Pine and Douglas Fir of the Pacific slope is worthless as building material in these islands, and although large quantities have been recently used by the United States military authorities in the construction of stables and warehouses, this can be considered only as an emergency expedient of the most temporary character as the buildings will doubtless be destroyed within a year or two.

One great obstacle to immediate suc-

cessful prosecution of lumbering in the Philippines is the same that stands in the way of all development of their natural resources, the lack of roads. Captain Ahern states in a report :

"There are no forest roads or river driveways in these islands that are worth mentioning. It will be impossible to exploit these forests until roads are constructed, rivers improved and harbors provided. The methods at present are exceedingly slow and expensive. The tree is felled far from any road, is hauled out very slowly by one or more carabaos, many tracts being left untouched, due to the difficulty of the haul and the lack of roads. The natives are not skilled lumbermen, and, while paid but a small wage, are by no means cheap labor when we consider the cost of felling and hauling a cubic foot of timber to the shipping point."

* * *

"There will be some difficulty in the construction of roads in such places as Cagayan, Mindoro and Paragua, but these difficulties can be overcome. The money for this construction should be appropriated from the forest revenues. Competent engineers should supervise the work. Stone is plentiful and available, but labor is scarce, and such as we have is poor and uncertain. This latter will be the one great difficulty; when that is solved, engineers and money will build roads that will make the Philippine forests yield a revenue that is undreamed of to-day by the residents of these islands."

To the lumberman this labor problem will, also, for some time, be difficult to solve, but this and other impediments will gradually be removed and then the future of the lumber business in these islands will doubtless present a very profitable investment for American capital and energy.

There are also other forest products that are worthy of exploitation and the attention of capitalists.

There are a great variety of rubber and gutta-percha producing trees, particularly in the forests of Mindanao and southern Palawan. The production of merchantable gutta-percha may become a most valuable industry if conducted under proper governmental regulations to prevent the destruction of the trees and the adulteration of the product which ruined a once promising trade when it was carried on by Chinese.

A large number of dye woods are known to exist, some of which have been utilized to some extent; also many trees which produce gums, resins, oils and balsams, valuable for their medical properties, which are well worthy of investigation by manufacturing chemists and druggists.

In all parts of the islands cocoanut palms grow without care or cultivation and the preparation of copra, oil and fiber is a remunerative business. Large plantations exist on most of the islands, for instance, on the island of Romblon, where the whole western slope of the island is one large cocoanut grove from the water's edge to the mountain top. The only drawback to this industry is the liability to destruction of the trees by cyclones, which are frequent, particularly on the northern islands of the group, but this may be avoided by establishing plantations south of the ninth parallel of north latitude, beyond which line destructive hurricanes are almost unknown. It is calculated that each tree will yield a revenue of $1.00 to $2.00 annually, with no more labor than is necessary to gather the nuts.

Many varieties of palms, bamboo, parasitic vines, canes and rattans abound and when the forests are opened up by the roads necessary for lumbering operations and scientific forestry, these plants will afford an increase to profitable employment of native labor and a stimulus to many of their smaller industries.

The forest products form a most important factor in the industrial and economic future of the islands. One of the most necessary steps toward making that great store of wealth available, is that which the government has taken, the establishment of a forestry bureau, which with good management will insure intelligent, honest and scientific exploitation and protection of the valuable forest lands.

TO CRESCENT CITY BY STAGE.

By R. T. Fisher.

Division of Forestry.

IF you take the stage at Grant's Pass in southwestern Oregon, and travel westward two days across the high spurs of the Siskiyous towards the Pacific Ocean, you will come, on the afternoon of the second day, to the edge of that marvelous strip of vegetation known as the Redwood Belt, which stretches southward over innumerable ridges and gulches and streams for four hundred miles along the sea, northward some thirty miles to its upper limit on the Chetco river, and which harbors in the remote clearings of its forests, communities as strange to eastern ears as towns in Australia. The actual margin, at least by this approach, is about ten miles from the ocean in the hills beside Smith River, but it seemed to me when I made the trip in early June that the wonders of the coast region really began twenty miles farther back, at the time the stage driver and I, alone in a rickety buckboard, crossed the bald divide of the mountains, and saw the infinite blue ridges stretching off southwestward. That was at seven in the morning, after we had toiled since two A. M. back and forth up the eastern slopes, following the narrow scratch of shelf called a county road. From that moment we were in another world. Instead of the still, frigid air of the canyons we had left, the dampness of a little sea breeze struck on our faces, and the growing things were thickening at every turn. Miles of vast almost precipitous hillsides showed pink and white and yellow with azaleas and rhododendrons. A few Pines stood about in clumps, but generally the shrubs clothed the ground in every direction; and as we clattered down from the sunlit summits to the shadowed hollows beyond, we came into an atmosphere of concentrated fragrance—a sort of vast reservoir of perfumes. Apparently the odors of the blossoms, which had been accumulating undisturbed through the night, had pervaded all the air in the valley.

That was my first experience of staging in northern California, and its successors were no less interesting. I know now that I should have been hungry at the time, having been bumping breakfastless since the early hour of two, but as it was, my thoughts were otherwise occupied. It appeared the stage driver had a wife and child back in Oregon, and he seemed to be under the impression that the faster he drove, the sooner he would "get to see them." The fact that he was heading directly away from them, and that neither end of his route was within a hundred miles of their abiding place, did not appear to move him. So, whenever there was a down grade, and the slim road, without rail, barrier, or space of any kind between the wheel track and emptiness, was winding along slopes that you hardly dared look down, he would set his pace for home; and in the worst places, on turns that ran straight off into the air, some tender reminiscence would occur to him, and he would roll his big honest eyes on me and relate it. Being then unaware that the mountain stage has succeeded the drunken man in the favor of Providence, I was not a sympathetic listener. I expected some kind of a surprise, and the thing that happened never entered my head. At one of our speediest moments the tongue came off the axle on the wrong side of the road, and the old rattle-trap buckboard went over the grade, horses and brake notwithstanding. Before we had time to do anything heroic we brought up in a bunch of scrubby Pines. "I'm late already," said the driver, picking himself out of the twigs. I righted the crazy vehicle and he unhooked the patient horses. We roped them to the hind axle, and, one steering by the drooping pole, the other driving, hauled the wagon up again onto the grade. Then the driver walked back a ways and found the missing bolt, rammed it into place, and battered the end with a

big stone; and we went banging along as fast as ever. "I ain't driven stage much," he explained apologetically, but with no trace of anxiety or concern for the problem before him. It was as though driving were a thing you might inherit or have thrust upon you, but need not worry to acquire.

Well, I was delivered in safety at the end of the division—a post-office and two houses at the forks of Smith River and I fell into the care of a man whose eyes never left his horses; but I parted from that first driver with real affection and admiration; he was so serene, and cheerful and secure in his oblivious incompetence. His naive good bye was "Take care of yourself."

Six miles farther on, after crossing the south fork of Smith River, the stage road slipped in among the tree trunks of a solid Redwood forest—solid not merely because almost all the trees were Redwoods, but because there was hardly any space among the boles. The Big Trees of the Calaveras or Mariposa Groves are perhaps individually more colossal, but for density of growth and height they must yield to these coast Redwoods. Sometimes they walled in the view at a hundred yards distance, and always they tapered upward through the green mass of tops high enough to bury three-fifths of the Washington Monument, or conceal many of the high buildings in New York. The vast interior through which the daily stage makes its creaking progress was silent and solemn as an empty church. Occasionally the wind hummed in the distant foliage, or a stray breeze sifted down and made uncanny commotion among the shrubs, but usually the tall ferns and flowered rhododendrons which covered the ground and the roots of the old windfalls, stood quiet and motionless as painted things. The place was full of shadows that lurked among the

THE STAGE FOR THE "CITY."

thickening columns in all shapes and sizes; and beside them patches of sunlight shifted slowly as the tree tops swayed. For six miles we crawled through the chilly twilight of these Redwoods, till coming suddenly over a small ridge, and down the other side, we looked out onto a broad meadow with several clumps of Pines upon it. Beyond was a long curving beach, Crescent City clustered at the horn, and outside the Pacific Ocean, heaving and whitening under the trade wind.

ALONG SMITH RIVER: REDWOODS IN THE BACKGROUND.

Crescent City, the county seat of Del Norte County, is a village of some fifteen hundred inhabitants, who are mainly supported by the operations of two sawmills. It lies in the lee of a very gentle sloping promontory which passes by the town and ends in a rocky point, and an island with a light house on it. The buildings are all wooden, mostly square and two stories high, and the sidewalks are planked and generally covered by the porches of the stores which line them. Front street, the street of promenade and gossip, is separated from the surf by a low wooden parapet and about a hundred and fifty yards of sand; and in winter, when thousands of cords of driftwood come out of the Klamath river and travel up the coast before the

sou'westers, wood and water are plenty on Front street. Only last January the door of the Allcomer's Saloon was forced by a Redwood log as big as a sewer main, and the billiard table was driven to the wall. Further excesses on the part of the elements often cut off Crescent City's mail and supplies, which arrive either by stage from Grant's Pass, or by weekly steamer from San Francisco. Snow perhaps falls on the Siskiyous barely forty miles from the balmy coast, and the townspeople may not see the stage for a week. Or again, if the sea is up (as it frequently is), the little steam schooner may have to bang about off shore for days, drummers, fresh fruit, newspapers, and everything, while she waits her chance to make the wharf among the rocks.

But if Crescent City is poor in communications, she is rich in compensations to the visitor. To begin with the neighboring sea shore is not to be surpassed for rugged varietyand picturesqueness. Northward from the rocky island where the lighthouse stands, grassy-topped cliffs with groves of Pines upon them break away into deep coves and solitary monuments capped with Spruces, or swell upward into high-shouldered headlands, where in June, green shrubs and fleshy little sea plants blossom, and whence, from a hundred pleasant nooks, one can watch the sun go down behind the ocean. Between these eminences are small beaches strewn with wet and barnacled rocks and flanked by echoing caves. Beyond and still farther north, the barriers sink away, the beach becomes continuous, and for as far as you can see, the great swells roll in unhindered.

For all this wealth of marine beauty, the traveller in Crescent City finds it hard to believe himself in a seaport town. The whole atmosphere of the place is anything but nautical. Instead of the fleet of small boats at their moorings, drying nets, and smells of fish one associates with seaboard villages of New England, there is hardly a craft along the beach (unless the steamer happen to be in), neither any nets nor fishy odors, nor any signs of a seafaring population, but only the bleak little wooden streets and men teaming lumber or moving it on push cars. If there is any smell at all in the air it is the smell of saw dust; any talk it is the talk of the woods and the logging camp, and as for sea fish, it is a food not thought of. It is a queer anomaly, this seaport without seamen, and it gives the sea an air of unreality almost disenchanting. Here is the Great Ocean of the South Seas and the trade winds, but where are the men who catch the fish and tell the tales?

Take the logging train at the mill and ride out with the friendliest trainmen in the business to the camp beyond the cut-over lands. There, beside the railroad are a cluster of cabins and a cook-house, and a little farther on, a building with a great donkey engine sticking through the roof. This stands on a raised landing beside the track. Away toward the wall of uncut timber, perhaps half a mile off through the stumps, stretches a wire cable following the course of a deeply grooved mud road. At the end of the mud road, in a mass of peeled and prostrate logs, is another and smaller donkey engine. These, with their respective crews and surrounding woodsmen, move the logs out to the train. In the far background the choppers fell the trees, taking sometimes two days of chopping and sawing and preparing the ground before they get one to earth; near at hand are the sawyers, one to an eight-foot saw, slowly "bucking up" gigantic trunks; and close about the donkey, the hooktender and his men fix the iron "dogs" in the logs, the blocks and wire rope among the stumps, and the load begins to gather. With constant shifting of rigging, hauling first one way and then another, starting and stopping, one, two, perhaps three logs are brought out to the mud road and coupled up with chains and iron "grabs." The endless cable is made fast, the electric bell signals the distant bull donkey, and groaningly the "turn" begins to move. Thus five or six times a day the big engine winds in a half mile of wire rope with tons of wood at the end. The whistles answer each other in the clear air, the logging train comes and goes across the plain, and now and again, loud over the distant roar of

the sea, sounds the crash and jar of a falling Redwood.

It is no sinecure, this logging. Limbs fall, descending trees go wrong, taut cables snap, hooks tear out—with such fearful heights, weights, and powers, accidents are frequent and fatal. But logging camps are famous for the men they gather, and by haunting those at Crescent City you can hear stories of forest and sea to your heart's content. There are men there who have sailed from the Baltic to Australia, from Sidney to Rio and the British Isles; who have fought in South American revolutions; who have served in the English army; who have worked in the big cities; and many who have chopped and hunted in the woods of the Pacific Coast since the first log was cut. Those are the fellows to listen to, and if you sit among them of an evening under the wonderful California stars, with the sea booming far off to the west; hear them describe high deeds as pleasures, and see their eyes kindle at the brave reminders, you will begin to understand the character of Crescent City and her sister settlements by the sea.

STUDY IN EUROPE FOR AMERICAN FOREST STUDENTS.*

By Overton W. Price.

Superintendent of Working Plans, Division of Forestry.

THE student who has completed a visit to the Spessart will be within easy reach of the Steigerwald and the town forest of Bamberg, the one well-known for its mixed forests of Scotch Pine and Beech and the other for the management of pure Scotch Pine woods under an elaborate system of clean cutting and sowing. He should also see something of the ancient town forest of Nuremberg which consists chiefly of woods of Scotch Pine on a soil that is little more than pure sand. The forest has an interesting history and is an instructive example of what skill and perseverance can do in rearing woods in so poor a locality, where frequent insect ravages and long standing rights to the collection of litter go to make matters harder for the forester.

The Bayerischer Wald covers a mountain range in southwestern Bavaria, running parallel with the Böhmer Wald, a second range, the summit of which forms the dividing line between Bavaria and Bohemia. Here exist forest conditions markedly in contrast to those prevailing generally in Germany. In this isolated and sparsely settled region where lack of facilities for the transport of timber and distance from the market greatly lower stumpage values, the form of forest management is peculiarly instructive for Americans.

In Saxony, where the forests are chiefly pure Spruce and where natural reproduction has been almost entirely abandoned for clean cutting and planting, the American student will see a form of management impossible under our conditions. He will, however, have a chance to study the most striking example that Europe affords of the dangers and advantages of a purely financial forestry. In Saxony, the most remunerative use of forests is the growing of Spruce for paper pulp. The diameter at which Spruce can be used there for this purpose and its rate of growth are such that it pays best to cut it when it is about sixty years old. At this age, however, European Spruce does not bear full crops of seed, and natural reproduction under a rotation of sixty years is impossible. It is thus that the system of planting and sowing has come about, it having been found financially preferable to natural reproduction and a longer rotation.

* The first part of this paper appeared in THE FORESTER for January.

The system is the most remunerative in Europe and there are Saxon forest ranges which yield a net revenue of twelve to fifteen dollars per acre per annum. On the other hand, it gives rise to dangers, from insects and from wind which are sufficiently serious to render its advisability an open question. The one is invited by the raising of pure evergreen woods of one species over large areas; the other by the clean cuttings, under which trees grown in closed woods become suddenly and fully exposed. The measures enforced to give the highest possible degree of safety against these dangers are largely peculiar to Saxony, particularly those which are taken as a safeguard against wind. The ranges are split up into a number of what are called cutting series, each series constituting an area which is treated separately. Since the heavy winds in Saxony are westerly, the object in the management of these cutting series is so to lumber them that the youngest woods occupy the west and the oldest the east side. With this in view, cuttings proceed always from east towards west, with the result that the closed forest is never suddenly exposed on the west side. A normal "cutting series," or in other words one in which there is a

A MATURE SPRUCE-WOOD IN SAXONY.

regular gradation of woods of different ages, presents a curious appearance and consists of a series of even aged blocks arranged like the steps of a stairway, from the youngest plantation to the mature stand, and each protecting the other from the wind. This elaborate precautionary measure has one weak point. So long as the heavy winds are westerly, it affords an entirely adequate means of protection. Now and again, however, a strong wind comes from the east, when it is free to work great havoc on the unprotected mature woods which bound the cutting series on that side.

The Schwarzenberg forest district, hard against the Bavarian border, contains some representative forest ranges among which are the most remunerative in the kingdom.

Having seen the systems applied to the mixed forests of the Schwarzwald and in the pure stands of Spruce in Saxony, the student will have had an opportunity to compare the two great types of forest management in Europe. The painstaking, patient methods by which reproduction is obtained in the Schwarzwald and a high degree of safety attained is in strong contrast to the Saxon system in which grave dangers are invited by direct violation of the silvicultural laws governing the natural development of a forest.

It is a question whether the student will find in Prussia, except upon the Pine Barrens, many notable forms of forest management which are not quite as forcibly illustrated in southern Germany. The Prussian working plan method is the most intricate of all and forest management generally in Prussia is more hampered by red tape than anywhere else in Europe. He should not fail, however, to visit the Salmuenster range in southwest Prussia, where Oak is reproduced naturally in instructive contrast to the treatment of the same species in the Spessart.

These are a few of the forest ranges which Americans have found instructive. To include them all would have been to make a catalogue of this paper. The list which has been given is suggestive only in its purpose. Before one has been long in Europe, he will be able to make his own plan of campaign far better than another can make it for him. The main point is to weigh that plan thoroughly, and above all, with a realization of the fact that European forestry, although simple in purpose, is intricate enough in its details to bewilder any one who approaches it in a desultory way.

It is also well to remember at the very outset, that no man can master the details of European forest management in a year, and that the profit gained from the trip will depend largely upon the selection made of those features to be especially studied. The American forest student will find scientific research highly developed in European forestry and he can waste a good deal of his time over abstruse lines of investigation which not infrequently owe their origin solely to the yearning of a scientist to investigate something. He should never lose sight of the fact that his main purpose in going to Europe is to see the effect of forestry upon the forest. The greatest practical benefit to him lies in the study of the woods themselves and of the working plans under which they are managed.

The student who goes abroad for a year has no time for a European forest school. Should he spend an extra six months in a semester at one of the several forest schools in Germany, he will have an interesting experience. However, one goes abroad to get what he cannot get at home, and the establishment of forest schools in this country has done away entirely with the necessity for students to attend them in Europe. Before this was the case, the forest school at Munich was most often chosen by Americans. It has an eminent corps of instructors, and Professor Henrich Mayer, who handles silviculture and forest utilization, adds to his remarkable brilliancy as a silviculturist an intimate knowledge of American forests and American conditions.

Living is proverbially cheap in Europe, particularly in the villages and smaller towns. In those cases where the student spends a month or more upon one range, it is customary for him to pay a fee of twenty-five dollars per month to the forest

officer. No fee is asked for short visits to forest ranges and the invariable courtesy of European forest officials makes these possible to anyone who bears the proper credentials. One thousand dollars is sufficient to pay all necessary expenses for a year in the woods of Europe, and permits of a fair amount of traveling. Less than that sum would curtail one's movements somewhat undesirably.

THE WORLD'S DEMAND FOR TIMBER AND THE SUPPLY.

By Raphael. Zon.

IN the beginning of the 19th century, when the amount of coal obtained from the mines was insignificant and the means of transportation were inadequate, while industry and population were rapidly growing, an opinion prevailed that the existing supply of fuel would not last long and that a fuel famine would follow. This common belief had a beneficial effect, for attention was drawn to the forests, and forest exploitation was placed on a more rational basis. A hundred years later, at the beginning of the 20th century, we see that this prediction is not realized, and that the forests are able to furnish large amounts of fuel for unlimited time to come.

Fear of a fuel famine no longer prevails, but instead, a timber famine is predicted, that is a lack of wood for structural purposes. This question was discussed at the International Congress of Sylviculture held in Paris last summer, where M. A. Mélard read a paper on "The Deficiency of Wood Production in the World," which has attracted general attention. Extracts more or less extensive appeared in nearly all forest magazines. Almost all of the following data are taken from the *Revue des Eaux Forêts*, the organ of French foresters. The author touches upon a question which is of interest not only to a forester but to any man occupied with social and economic problems. The cardinal idea which he tries to emphasize can be briefly formulated as follows: The amount of timber consumed at present all over the world exceeds the amount normally produced by the forests; hence this excess of consumption over the normal production is covered at the expense of the main wood capital, thus leading to devastation and destruction of forests in those countries which have still large forest areas, such as Canada, Russia, the United States. To prove this statement Mélard presents figures, seemingly carefully collected, concerning the export and import of timber of all civilized countries. The statistics of timber export and import together with the information as to the magnitude of the available ripe crop, condition of the growing crop, rate of growth, and rate of wood consumption are the only means by which a fair idea of the timber supply of a country may be obtained.

M. Mélard begins with England, and states that the British Isles are but little forested. The wood produced in England itself is of inferior quality and far below the amount necessary for the needs of its commerce and industries. It is obliged, therefore, to rely upon other countries for its wood. The average annual imports of timber into Great Britain during the past five years have exceeded the exports by 423,600,000 cubic feet which is about 99 per cent. of its total consumption. This does not, however, represent the amount actually cut to cover England's need for wood. At least two-thirds of the timber imported by England consists not of logs but of products already more or less fit for direct use; so that more than 423,600,000 cubic feet must be cut to supply the entire wood consumption. M. Mèlard, therefore, gives 529,500,000 cubic feet as the amount of timber which has to be cut to supply England's demand. This yearly timber supply costs England $94,000,000 and

corresponds to the annual productivity of about 12,375,000 acres of such well managed and well kept forests as the Prussian State forests.

Germany, although it has 35,000,000 acres of forests excellently managed and yielding an immense revenue, demands increasingly greater quantities of wood, so that for the last ten years the amount of timber which it buys has doubled and its value trebled. In 1898 the excess of importation over exportation was equal to 317,700,000 cubic feet, or 24 per cent. of its total consumption.

France produces a surplus of cord wood and small sized timber which it exports to neighboring countries, chiefly to England. But France is compelled to buy large sized timber, and for the last five years the imports have exceeded the exports by 105,900,000 cubic feet. This amount is equal to half of the general productivity of all French forests and 33 per cent. of its total consumption.

Belgium imports annually 63,540,000 cubic feet of timber more than it exports, or 47 per cent. of its total consumption. Holland imports annually 21,180,000 cubic feet of timber wood, or 52 per cent. of its total consumption, for which it pays more than $3,000,000. Switzerland buys every year abroad 49,420,000 cubic feet of timber, or 35 per cent. of its total consumption, worth nearly $3,000,000. The States of Southern Europe, such as Spain, Italy, Portugal, Greece, Turkey, Bulgaria and Servia, whose industries are little developed, demand less timber than the countries above-mentioned, but they buy considerable quantities of wood every year.

Summing up these figures it is seen that a large portion of middle, western and southern Europe, with a population of 215,000,000, requires annually about 1.23 to 1.41 billion cubic feet of timber for which is paid about $200,000,000. This amount of timber corresponds approximately to what might be produced on twenty-five to fifty million acres of forest land.

Who furnishes this timber? Austria-Hungary produces annually 794,250,000 cubic feet of wood, a considerable portion of which is exported to other countries, chiefly to Germany. Deducting the amount of wood which is imported by Austria-Hungary, its total supply of timber to the world market in 1898 was equal to 240,040,000 cubic feet. Although the export of timber from Austria-Hungary has been increasing during the last years, there are reasons to think that the greatest limit has been reached.

The forests of Norway furnish a considerable quantity of timber to the world market. In 1898, 70,600,000 cubic feet of timber were sold in addition to 49,420,000 cubic feet in the shape of pulp, making thus a total of 120,020,000 cubic feet. The forests of Norway are being exhausted, chiefly by clear cutting, which is practiced since the pulp industry can utilize even small sized timber. The timber supply of Sweden to the world market amounts to 317,000,000 cubic feet of timber with 35,300,000 cubic feet of wood additionally in the shape of cellulose.

Russia furnishes considerable quantities of timber, chiefly to England, Germany, France, Belgium and Holland. In 1897 there were sent to these countries 257,690,000 cubic feet of wood; in addition Finland exported 158,850,000 cubic feet, making a total of 416,540,000 cubic feet. Besides the European countries just mentioned a considerable amount of timber is exported also from Roumania, Bosnia and Herzegovina.

The forests of the United States, according to M. Mélard, are to a greater extent consumed, although the yearly exports amount to 116,490,000 cubic feet, worth about $20,000,000. This export is apparently carried on at the expense of the main wood capital, and, according to Prof. B. E. Fernow, whom M. Mélard quotes as an authority, the present consumption of wood within this country itself is so great that the annual increment of the existing forest-area is hardly able to satisfy it. With an increase of population and greater development of industries it is reasonable to expect not only a diminution of exports from the United States, but also an increase of imports of timber, especially from Canada.

The forest resources of Canada are immense, the forest area is estimated as more than 800 million acres or 38 per cent. of the total area. The export of timber from Canada in 1898 was approximately determined as 162,380,000 cubic feet and its value as $27,600,000; to this must be added the export of pulp worth $1,200,000.

The amount of timber supplied to the world market by Austria-Hungary, Russia, Sweden, Norway, the United States, and Canada approaches the figures given for the demand of timber, namely about 1.23 to 1.41 billion cubic feet. From this we may conclude that at present the supply of wood on the world market covers the demand. The question is, how long will the exporting countries be able to furnish this amount of timber? The price of timber is constantly rising; but in forestry this advance in value in contradistinction to other industries, does not lead to the increase of production, but, on the contrary, to more rapid destruction. The forests already in existence become depleted, the old stands are replaced by young ones, and often the cut areas are abandoned altogether. Taking in consideration the gradual decrease of the forests and the growth of population. M. Mélard comes to the conclusion that the equilibrium between the demand and supply of timber in the world market, supported at present mainly by Russia and Canada, will not last more than 50 years after which there will come scarcity, and as a consequence high prices.

M. Mélard briefly discusses also the posibilities of timber supply from the tropical countries; he considers that there is little to be expected from the virgin tropical forests of Africa and South America. While these forests are rich in woody species comparatively few can be substituted for the wood of our conifers, so extensively used for many purposes. Besides, the rapidity with which everything decays in the tropics and the soft, never freezing soil make immense difficulties in transportation.

M. Mélard emphasizes the necessity of taking measures at once in order to avoid a timber famine in the future, because the maturing of a forest harvest requires many decades. His proposed remedy is to reforest many million acres of land unfit at present for agricultural purposes to preserve the forests already in existence, to relieve forests of heavy taxes, and to lengthen the rotation in order to produce timber of large sizes.

It is interesting to note that not M. Mélard alone is concerned about the future timber supply. Here and there in the periodicals one meets with articles devoted to the question as to how much the present exploitation of the forests of a particular country corresponds to their normal productivity, and the most interesting fact is that the conclusions to which the authors of these articles come independently, seemingly confirms the opinion expressed by M. Mélard as to the world's supply of wood. Thus, not long ago Prof. H. Mayer, in the *Allgemeine Forst und Jagd Zeitung* (1890, Nos. 3, 4, and 5), figured out the forest resources of Russia, and states as his opinion that Russia can furnish timber of large size only for fifty years, at cheap prices. Henry Gannet, Chief Geographer of the United States Geological Survey, in an article entitled "Is a Timber Famine Imminent?" in the *Forum* for October, 1900, makes a similar study of the forests of the United States. Mr. Gannet estimates the amount of standing timber of merchantable size and quality in the country west of the Plains as 630 billion feet (B. M.). Of this 30 billion are to be found in the Rocky Mountain Region and 600 billion feet in the Pacific Coast States. These calculations are more or less accurate as they are based on the results of the examinations which have been carried out with considerable care during the past three years, both within and without the forest reserves, for the purpose of aiding in the administration of the reserves with reference to the establishment of new reserves, and to gain information about the local supply of lumber in various parts of the West. The information concerning the eastern part of the country is scanty, all estimates, therefore, must necessarily be mostly guess work. Mr. Gannet thinks that the average stand upon the wooded

lands in the East does not exceed 1,500 feet per acre. The forest area in this part of the country is somewhat less than half a billion acres. The stand of timber upon it, therefore, may be about 750 billion (B. M.). Adding up together this amount and that estimated in the West (630 billion feet) the total stand in the country would appear to be in the neighborhood of 1,380 billion feet (B. M.). The rate of consumption is expressed in the annual cut which at present is a little more than 25 billion feet. The present stand, the increment not taken in account, would, therefore, supply the present rate of consumption for about 50 years. Further, it is estimated that the average acre of woodland produces annually one-third of a cord by growth. The annual increment of all our forests amounts, therefore, to over 300 billion feet (B. M.) of which only one-tenth or 30 billion feet consists probably of merchantable timber. This 30 billion as compared with the amount of timber annually cut (over 25 billion feet) at first glance seems to be a little in excess of the annual demands of our sawmills, but if to these requirements be added the amount of timber annually destroyed by fire and other sources of loss it is altogether probable that the mere annual increment of our forests is hardly able to satisfy the existing need for wood.

A CHARACTERISTIC STAND OF TIMBER IN THE WHITE RIVER PLATEAU REGION IN COLORADO, SHOWING LARGE GRASSY PARKS WHICH ARE THE PROBABLE RESULT OF OLD FIRES.
(From the Report of G. B. Sudworth, 20th Annual Report of Geological Survey, Part V.)

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The Forester's Vocabulary. When Dr. Johnson published his dictionary he wrote in the preface, "When I took the first survey of my undertaking, I found our speech copious without order and energetic without rules; wherever I turned my view there was perplexity to be disentangled, and confusion to be regulated; choice was to be made out of boundless variety, without any established principle of selection—and modes of expression (were) to be rejected or received without the suffrages of any writers of classical reputation or acknowledged authority." There could be no better description of the looseness and carelessness in the use of words now so common in what is written about forestry in America than this, or of the difficulties which present themselves to any one who attempts to introduce order into at least his own vocabulary. But this is all the more reason why people who are interested in forestry should try without delay to adopt something approaching consistency of definition. There are many words of which the usage can only be settled with time, but with regard to the meanings of others it should not be difficult to establish some sort of agreement. Such words are: *forestry* (as a noun, and as an adjective); *forest* (adjective); *forestal; forestral; forestrial; to aforest; reforestation, reforestration, reaforestation, reaforestration, to deforest, to deforestate, deforestation, improvement cutting, thinning, clearing, cleaning*, and many others.

We invite correspondence on this subject and hope to take it up again in a later issue.

The Opportunity in New Hampshire. The long-hoped-for crusade for rational treatment of the forests is getting under way in New Hampshire at last. On January 21st a meeting was held in the offices of the State Board of Agriculture, at which the first steps in the formation of a State Forestry Association were taken. A committee of organization was appointed and the support of a number of the men of most influence in New Hampshire was gained for the movement. This is a good beginning, but considering the conditions under which this movement has started the still remaining task of launching the Association safely is no easy one. Those who are most actively interested in New Hampshire's forests are on the one hand the lumbermen, and on the other the summer visitors, and the residents who in one way or another are interested in the business which these bring. It is friction between these two groups that has done more than anything to arouse interest in the proposed forest association, and yet if those who are organizing it fail to realize that only a policy of reconciliation can succeed, they will surely throw away the opportunities which have thus far been gained.

The field in which first, and for many years to come, a New Hampshire Forestry Association can do most good is in educating the people of the State, and those who, though citizens of other States, own property in New Hampshire, up to an understanding of the truth that forestry—conservative and careful exploitation of the woodlands—is the only ground on which the lovers of nature, so frequently cried down as "sentimental," and the lumbermen, as often maligned as "tree-butchers," can meet. For on the one

hand the hotel owners and the people generally have a right to insist that lumbering must not mean the laying bare and burning over of mountain sides, and on the other the owners of woodland may expect to have it recognized that for the welfare of New Hampshire, poor as a farming State, a large crop of merchantable timber is important. The only question is whether the forests are to be destroyed or rejuvenated in the cutting. That destruction is not necessary is what the New Hampshire Forestry Association should set itself to teaching both the lumbermen and the summer-cottagers and farmers. The big companies with large holdings which they cannot afford to have depreciate are already finding this out for themselves; the tourists on their side need only remember that the Black Forest region in Germany, which is managed by the axe for wholly commercial ends, and which yields an enormous annual lumber output, is one of the most beautiful and much visited regions in Europe. By securing a competent and vigorous State Forest Commission, by cooperating with it in its educational work, and by undertaking on its own account the work on which a well advised citizen's organization can make its influence felt in countless ways, the New Hampshire Forestry Association can surely be of great service to its own State and to New England. The recent experience of the lecturer of the Massachusetts Forestry Association before an audience of farmers at Lisbon, New Hampshire, who had driven in from as far away as twenty miles, shows that the people are ready to take forestry seriously. The new Association should not disappoint them by making an unpractical start.

Appropriation for Forest Work.

At the time of going to press the Agricultural Bill carrying the next year's appropriation for the Division of Forestry and the other divisions of the Department of Agriculture has just been under debate in the House. As first reported by the Committee on Agriculture this bill differed on forest matters from last year's in two notable particulars. It authorized an appropriation for a Bureau of Forestry instead of a Division of Forestry, and placed the total appropriation at $187,240 instead of $88.520 as last year. On the objection that to raise a Division to the rank of a Bureau was new legislation and that new legislation could not pass in an appropriation bill the clauses making appropriations for the "Bureau of Forestry" and three other "Bureaus" were struck out. An amendment was introduced by Mr. Wadsworth, however, which restored the full appropriation to the "Division" of Forestry. This bill has not yet been considered by the Senate, but it is hardly likely that the appropriation will be reduced, and quite possible that the Division of Forestry may still be raised to the rank of a Bureau this year.

Nothing could make clearer than the increases of appropriation during the last four years the rapidity with which forestry and the forest work of the Government have advanced in public estimation. In 1898–99 the appropriation for the Division's work was $28,520, in 1899–1900 it was $48,520, this year it is $88,520, and next year it is likely to be $187,240. Meanwhile nearly forty-seven million acres of public land are waiting to be surveyed by the Division, or Bureau as it is to be hoped it will be, and the applications for working plans from State and private owners have passed four millions and are rapidly increasing.

Proposed Changes in New York.

Governor Odell, of New York, in his annual message to the Legislature, recommended the consolidation of the Forest, Fish and Game Commission and the Forest Preserve Board. His reasons for the proposed change, as set forth in his message are: that each body to a certain extent overlaps the field of work of the other, and that by combining the two Commissions the work could be done as effectively as at present, and more cheaply by $35,000 per annum.

The meaning and advantage of this

proposed change may be best understood when the organization of the present Commissions, and their duties are considered. At present the Forest, Fish and Game Commission is made up of five members appointed by the Governor with the consent of the Senate. Its duties include the active administration of the State Forest Preserve, and also the protection of fish, game, and shellfish interests. Under the existing law the President of this Commission receives an annual salary of $3,000, and each of the other four members of the Board gets $2,500 per annum. In addition each Commissioner is now allowed $800 a year for travelling expenses. The Forest Preserve Board as at present constituted, is composed of three members, appointed by the Governor from the Forest, Fish and Game Commission, and from the Commissioners of the Land Office. The duty of this Board is to purchase land for the State Forest Preserves.

Governor Odell's suggestions, which have already been embodied in a bill and introduced in the Assembly, would substitute for the present arrangement a single commission. The bill directs that this new Commission shall consist of three members who are to be appointed by the Governor with the consent of the Senate. Two of these Commissioners, judging from the bill that was first introduced, will be chosen from the Commissioners of the Land Office and are to serve without pay. The third member, who is to be appointed for a term to expire on December 31, 1901, and whose successors are to hold office for three years, will receive a salary of $5,000 per annum and will be the executive officer of the Commission. The new Commission will do without the services of an assistant secretary. It will be permitted, however, to expend $2,000 per annum for the services of a secretary, and whatever reasonable amount is required for the employment of an engineer and clerical assistance.

What this practically amounts to is putting one man in charge of the work which two Commissions have been handling. As no one man can take care of this work properly, it is inevitable that, for the management of the forest, fish and game interests of the State, the advice and assistance of experts in these matters would be called in. As the work in New York State is great in amount, as well as in importance it is probable that the connection of these experts with the Commission would be more than an occasional one, and the salaried member of the Commission would thus have to be a good executive officer above all else. What is practically a single-headed management makes a great deal depend on one appointment. If a poor man should be appointed the results would be much worse than would be possible under the present arrangement, but the responsibility would be centered and the difficulty would be more easily remedied. On the other hand the new arrangement would give to a good man much more power and opportunity for usefulness than the present one. That good men can be secured Mr. W. Austin Wadsworth, the president of the present Commission, has proved. If he or some one like him were appointed to the third place on the reorganized Commission, the proposed change would be a long step in advance in the management of New York's forests.

NEWS, NOTES, AND COMMENT.

National Board of Trade on Forestry. The National Board of Trade recently adopted the following resolutions:

"WHEREAS, The continued prosperity of agriculture, lumbering, mining, transportation and commerce, throughout the United States, is inseparably related to the preservation and conservative use of our forests; and,

"WHEREAS, The steady development

of the irrigable West and of the commerce tributary thereto is impossible without the conservation of the forests; it is,

"*Resolved*, That the protection and perpetuation of our forests by selective cutting and conservative use under expert forest management is a matter of National moment; and,

"*Resolved*, That the National Board of Trade respectfully urges the extension of the forest reserve system throughout the United States; and,

"*Resolved*, That the concentration of all responsibility for the care and preservation of our national forests under a single head in lieu of the present division of jurisdiction among three unrelated organizations, is of prime necessity to all the interests which depend upon our forests; and,

"*Resolved*, That the National Board of Trade respectfully urges upon Congress the establishment of the proposed Minnesota National Park, and of the proposed Southern Appalachian Forest Reserve, as a just and necessary measure of forest protection to those portions of our country which at present contain no National forest reserves."

Committee on Irrigation and Forestry: Wm. H. Chadwick, President, Chicago Commercial Association; F. B. Thurber, President, United States Export Association; D. R. Francis, Ex-Secretary of the Interior and Ex-Governor of Missouri; Geo. F. Stone, Secretary, Chicago Board of Trade; Geo. H. Maxwell, Executive Chairman, The National Irrigation Association.

Forests and Erosion. Mr. Gifford Pinchot is now conducting a page devoted to Forestry in *Outing* which all who see that magazine will do well not to pass by. On page 23 of the last *Forester* a paragraph about the increasing adoption of forestry by private land owners was quoted from this department in the January *Outing*. In the issue for February, Mr. Pinchot considers the influence of forests on the flow of streams and the successful operation of irrigating works, and says among other things:

"Just how necessary to the prosperity of the irrigable West the forests really are, is not always evident at first sight. The loss of water from evaporation, and the practical destruction of storage reservoirs (and less completely of the distributing canals as well) by their filling up, with silt carried by the streams from denuded slopes, are two of the most vital dangers to irrigation; and, for them both, the forest is the remedy. When we remember that the loss of water by evaporation in an irrigated part of Arizona has risen to thirteen inches in a single month, the possible waste is nothing less than appalling. Against it, the forest is the first and greatest safeguard, as it is also against the tying up (to use a term not strictly applicable) of irrigation works by silt.

"The consequent impoverishment of large numbers of once prosperous farmers is as old a story as it is a sad one.

"'The reservoirs,' says Vice-President elect Roosevelt, 'cannot last if they fill full of silt, and the only way to prevent this filling with silt is to preserve the forests themselves. The forest is a great sponge for absorbing and distilling water. It is the great preventor of erosion, and erosion is always the danger point in any irrigation system.'

"The far-reaching effectiveness of intelligent foresight in dealing with such questions, as these is almost beyond overstatement, as the lack of it is almost certain to be punished beyond our expectation. From perfectly preventable overgrazing, I saw, this spring, a dam filled so full of silt, from the erosion of denuded slopes above it, that the owner had dug a ditch through the center of it, to let the water through. We are far too apt to consider that obvious, and, so to say, habitual evils—like the loss from fire and flood—are without remedy. In the present instance, the remedy is perfectly well known."

More About the Proposed Minnesota Park. The Iowa Academy of Science recently passed the following resolutions in favor of the proposed Minnesota National Park:

"In view of the fact that there is now a petition before Congress from the people of the State of Minnesota asking the setting aside of certain tracts of timber land included in the Leech Lake Indian reservation in Minnesota, except such lands as have been allotted to the Indians in severalty, as a National Park and Forest Reserve, for the purpose of preserving the timber and conserving the water supply of the Mississippi river, and in view of the fact that other tracts of timber lands in the northern part of Minnesota, Wisconsin and other States and Territories in the Union from which the timber has been removed, which have reverted back to the government, should be set aside for forestry purposes that they may again be covered with forest growth to supply coming generations, therefore,

"*Resolved*, That the Iowa Academy of Sciences in session hereby petition Congress, first, To segregate for park and forestry purposes, the said tract of land at the headwaters of the Mississippi and such other lands as Congress may have control over in the States of Minnesota and Wisconsin and in other States, especially the Rocky Mountain and Sierra regions, to the end that not only the timber supply of said States may be partially saved but for holding the moisture in said regions, and also for the preservation of our wild game. Second, we also favor the purchase of the land for a proposed Southern Appalachian National Park.

"*Resolved third*, That the government withhold from the market public lands covered with timber, that the mature timber on the same be sold under the supervision of a technically trained forester. Fourth, That we urge upon our delegates in Congress the feasibility of concentrating the forestry work; and urge that the government establish a rational system of forestry, especially with reference to our forest reserves, and fifth, That the supervision of these forest reserves be placed in charge of trained foresters, all under one responsible head, preferably the United States Department of Agriculture, to the end that a more rational system of forestry may be introduced in this country.

"[Signed.] L. H. Pammel, T. H. MacBride, H. A. Mueller, *Committee*."

Professor Samuel B. Green, of the University of Minnesota, concludes a recent bulletin of the State Agricultural Department, on the expense of the proposed National Park for Minnesota, as follows:

"If the above figures are correct the proposed park, merely as a financial venture, will take care of itself, and as an example in good forestry and a place for recreation for our people it ought to be above almost any price. Besides, from the purely economical standpoint, the establishment of this park would have the effect on the surrounding country that the establishment of any great, permanent manufacturing concern has, and would undoubtedly result in much improvement over the ordinary way of cutting timber in this State which so often has left a trail of stagnation behind it. Why not try such a plan as this? Surely the government can well afford to do so, and it cannot possibly be any worse than the plan of selling all the timber to the highest bidder without any regard to the interests of posterity."

In the Legislatures. Last spring when Congress adjourned it left, with other unfinished business, two bills relating to proposed national parks. This winter bills looking toward the establishment of these parks and the purchase of land for a new reserve have been brought up in the present session, but at the time of going to press, are still undisposed of. The third, the Appalachian Park project, is the one with which matters have gone most favorably thus far. The bill which has been introduced both in the Senate and in the House provides five millions for the purchase of not more than two million acres in the Southern Appalachians. One of the best features of this bill, which will be a surprise to many who have been speaking of a proposed Appalachian "Park," is that it provides for a "Southern Appalachian Forest Reserve" of which the purchase and care are to be intrusted to the Secretary of Agriculture. This means that the reserve,

if established, will be under the supervision and direct charge of the Division of Forestry of the Agricultural Department, the only bureau in the Government which employes trained foresters. The passage of this bill would be the first frank committal of national forest lands to the care of this division, and would put the Appalachian Park on a much more advanced footing than the other National Reserves and Parks.

Of the Minnesota Park project the only thing that can be said is that opposition from Duluth has thus far prevented its being brought up in the House. The legislation which is now asked for would simply provide for a committee of enquiry, to which no one should object. But even looking beyond this no one would profit more in the long run by the establishment of the park than Duluth and the neighboring lumber districts.

A bill providing for the condemnation and purchase by the Government of the Calaveras Grove has been introduced in the House, but at the time of writing nothing has come of it. It is hardly conceivable that the Government should neglect to purchase and preserve this grove. It would be good if in connection with it the proper management of the Sequoia and General Grant Parks, about which Professor Dudley wrote in the December FORESTER, and concerning which the Superintendent has recently made recommendations to Congress, could also be provided for.

An act "to provide for the joint investigation with the Federal Government of the water resources of the State, and of the best methods of preserving the forests thereof," recently introduced into the California Senate, provides an appropriation of $107,200 for the ends in view. This sum, though it is to be spent by unsalaried commissioners, who are not allowed to pay out more than the collaborating departments of the Government, is reassuringly large, and augurs well for forest management in the State. With practical and scientific reports in prospect which shall thoroughly define California's needs, there should be a reasonable certainty of really effective legislation, such as will not only ensure the protection of those forests that remain, but provide for the rejuvenation of those that have been cut.

The Forests of Wyoming. Mr. Henry Michelsen, Vice-President of the Colorado Forestry Association, writing on "The Forests of Wyoming," calls attention to the great benefits that would result to irrigation in the State from proper forest preservation. The following is quoted from an article which appeared in *The Wyoming Industrial Journal* for December:

"The important function of forest cover in a country of the general condition and physical formation of Wyoming consists in its water-preserving qualities. Where the forests can act as natural reservoirs, the flow of streams continues quite evenly throughout the summer, permitting irrigation during the whole of the growing season. Where they have been destroyed, the water in the rivers must be more abundant during the spring and early summer months and insufficient for use later, when it is most needed. The Wyoming ranges running in isolated chains, their evaporation is greater than that prevailing in Colorado, where the highest mountain chains converge, forming solid bodies of alpine forests just where they are most required for the protection of watersheds. It appears, therefore, that if the people of Wyoming desire to attain the highest development of their agricultural resources it will behoove them to take the utmost care of the woodlands within their borders.

"The summer of 1900 has been exceptionally severe on forest growth by reason of the numerous fires, which commenced early in the season and were very destructive. Forest fires can benefit no one; their danger as regards life and property is so great that to prohibit starting them would seem an obvious duty. The secondary injuries as to water supply and climatic conditions following in their wake must add force to the arguments adduced for their avoidance. Unfortunately, no records ap-

pear to have been kept as to the extent of the devastation caused by conflagrations during the last season, but it is known that nearly one-tenth of the forests outside of the reserved areas have been burned over."

AMONG FOREIGN AND AMERICAN PERIODICALS.

In *The Swiss Forestry Journal* for December, 1900, there is a noteworthy review by Dr. Frankhauser of a recent brochure on the forest and water question ("Zur Wald und Wasserfrage") by the renowned specialist, Dr. Ebermayer of Munich.

According to this brochure a large part of the moisture which is precipitated in the form of rain and snow is intercepted by the forest crown. This varies according to the nature of the crown and the intensity and duration of the rainfall. The forest floor in consequence receives less moisture than the open field. By the process of transpiration much water is consumed by the forest in the process of growth. The amount transpired by the leaves of the forest is at times large and probably much more than is conserved by the protection which the canopy affords from evaporation by the sun and wind. Owing to the fact that the rootage of the forest is deep the level of the ground water is lower than that of the open field; were one to argue the problem from these premises alone he might very easily conclude that the forest after all plays a very insignificant rôle in the conservation of moisture.

As Dr. Frankhauser points out, for a large part of the year, in northern climates and mountainous regions, transpiration does not take place. It is probably also not very active when the atmosphere is moist and at night. It is therefore very easy to overstate the amount of transpiration. A large proportion of the moisture of northern regions and high altitudes falls in the form of snow which lingers longer in the shade of the forest than in the open. (See illustrations in the latest report of the Colorado Agricultural Experiment Station.) It is easy to see how the influence of the forest in this respect depends very largely upon altitude and latitude.

It is worth noting here that, even though it may not be actually raining the leafage of forests in high mountains collects moisture from the saturated atmosphere. It congeals on the twigs and leaves from a foggy or misty atmosphere. There is a constant drip of water from the branches to the ground. This must occur also at times in lower regions. During such times transpiration is practically nil. No definite conclusion can ever be reached in this matter until the amount of transpiration is measured. Owing to the fact that this varies with every species, every hour of the day, every day of the year, and with every locality and soil, it is simply impossible to ever compute it with the slightest degree of accuracy. Transpiration is not sufficiently understood to be properly rated as a factor in forest influences although it is no doubt a very important one. The distinguished botanist Haberlandt in his "Botanisch Tropenreise" says: 'The numerous transpiration experiments which I conducted on a great variety of plants in the Buitenzorg Garden have led to the conclusion that in the humid atmosphere of Java, in spite of the high temperature, the amount of moisture transpired is from two to three times less than in temperate regions." He also concluded that the transpiration stream and the process of nutrition are pratically independent of one another and that although they go on together, nutrition takes place by osmotic action at a time, when owing to the extreme humidity of the atmosphere, transpiration is impossible. Indeed in spite of all sorts of conclusions few deny that forests are great collectors and conservators of moisture, especially in mountainous districts.

The *Belgian Forestry Bulletin* for December, 1900, contains an interesting article on the Forest of Fontainebleau. It is a discription of the excursion of the 100 foresters of the International Congress at Paris. It is of special interest in that the author is a Belgian who is an unprejudiced observer. He criticizes the forest administration to the effect that the Forest of Fontainebleau is far from what it could or ought to be.

A very interesting announcement in the Forestry Department of the *Queensland Agricultural Journal* for December, 1900, relates that at a conference of the saw mill owners, timber getters, timber merchants, sleeper-getters, squarers, log handlers, and others interested, have unanimously agreed that new legislation in reference to the forest lands of New South Wales is imperative. They have strongly advocated to the Minister of Lands the reservation of the whole public forest domain. Similar action is likely to follow in other Australian States and there are signs that these progressive people are about to establish an up-to-date forest policy. This sort of movement from the lumbermen of the country speaks well for the patriotism and common sense of its people. The absolute governmental control of forests would be in keeping with the sentiments of its people and it is indeed a wonder that their forests have been so long neglected.

The first article in *The Indian Forester*, for December, relates to the manufacture of paper from the paper mulberry in Burmah. A sheet of this paper, which resembles a light brown manilla paper, accompanies the illustration of

a native paper making factory. The bark is scraped and then peeled off in sections about five feet long. It is then dried and bleached for a couple of days or more in the sun. It is then put in a caldron of water and wood ashes and slowly cooked from six to twelve hours. It is then washed and pounded into pulp with mallets. The pulp is then placed in trays with cloth bottoms. The water trickles through and leaves a thin sheet of paper which is dried and rubbed to render it firm and smooth. This paper is remarkably strong. It consists of many fine but strong interlaced fibers. This material might be used to advantage in giving strength to a poor grade of pulp in the same way that cotton fiber is used. The fibers of this bark in fact resemble fine cotton fibers. The paper mulberry grows rapidly in this country and regenerates itself by means of rootsuckers with remarkable vigor.

The November issue of *The Indian Forester* contains a description with Illustrations of the Caillet Monorailway. As the author points out, cheap transport is the most pressing problem of modern life. This applies especially to American forests where labor-saving devices are absolutely necessary. The utilization of all forest products, even the brush, is as great if not a greater problem than forest production. If we can devise uses for the slash in our woods the greatest American forest problem is solved. The utilization of this material depends entirely upon labor-saving devices. Cheap railways are replacing wagon roads in many districts. The wire cable way has revolutionized many industries, and, if what the writer has to say for the monorail is correct, it too deserves a prominent place among our common means of transportation. Several monorails have been described from time to time in European journals but none of them as yet seem to have gained a very strong foothold. This monorail system as described in *The Indian Forester* consists of a single iron rail—the rails are joined together by scabbard fish-plates. There are no sleepers. The rail rests on steel sole-plates. It is so arranged that the car is in no danger of toppling over. Anybody can build the road and a mule can pull two tons, or a workman can push a car containing eight hundred pounds with ease. It costs no more than a wagon road and has the advantage of a wagon road in that it can easily be moved from place to place. It is being used in several places to do what was formerly done by pack trains. JOHN GIFFORD.

RECENT PUBLICATIONS.

Report of the Chief Inspector of Timber and Forestry for Canada, 1898. E. STEWART. Part IX: Annual Report of the Dept. of the Interior for 1899. Pp. 20.

This report contains a summary of the timber lands of the Dominion of Canada independent of the several provinces; descriptions of the timber reserves; of the results of tree-planting on experimental farms, and tabulated lists of forest trees and ornamental shrubs which are considered most useful for general cultivation in Manitoba. It states that during the past few years the Government has set apart more than 1,700,000 acres of timber land in reserves. The fire question is discussed, and recommendations for forest management are made.

The Forest Nursery. By GEO. B. SUDWORTH. Bulletin No. 29, Department of Agriculture, Division of Forestry. Pp. 63, Plates VI., Figs. II.

This bulletion is not a report or an essay but is designed to be instructive and above all useful. A glance at its index will give the best idea of its scope. The chief heads in the table of contents are—"Collecting Tree Seeds and Care before Planting," "Propagation of Trees from Seeds and Cuttings," "Wintering and Transplanting Seedlings," "Use of Wild Seedlings," "List of Useful Timber Trees to Plant." To go into detail would here be needless and difficult for the Bulletin considers nearly all the questions which the tree-planter is likely to ask himself—from the proportion of his seed which will germinate to the methods of preparing the soil for nursery stock and those of cultivating the plantation—and is besides an ideal manual in the way of terseness and compactness. It is practical throughout, apparently avoids the danger of generalizing from experience in one locality, and the different statements, estimates, and recommendations with which it is necessarily filled are all conservative. It is plainly the work of an economic tree-planter who knows his subject—still a rare article in this country; and considering the rapid spread of interest in forestry is most timely. The illustrations deserve praise.

PUBLICATIONS RECEIVED.

Geology of Osceola and Dickinson Counties. By T. H. Macbride. Report of the Iowa Geological Survey for 1899.

Some new Species of the Genus Cratægus and Notes on some Dichotomous Panicums. From the Herbarium of W. W. Ashe, N. C. Geological Survey.

On the Forest Conditions in the Vicinity of Milwaukee. By Ernest Bruncken. Bulletin Wisconsin, Natural History Society 1: 3.

Duty of Water in the Gallatin Valley. By Samuel Fortier, C.E. Reprinted from the U.S. Department of Agriculture, Office Experiment Stations, Bulletin 86.

The Lumber Trade of the United States. From the Monthly Summary of Commerce and Finance for November, 1900. Treasury Department, Bureau of Statistics.

[To be reviewed later.]

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"The London Spectator" remarks concerning Dr. Morrison's narrative of the siege:

The *Times* has at last received and published a full narrative from its correspondent, Dr. Morrison, of all that preceded and accompanied the siege of the Legations. Gibbon could not have told the story better. It is obviously impartial, full of detail, yet clear and consistent, and it has been accepted throughout the Continent as *the* history of that strange episode in the relations of Europe with Asia.

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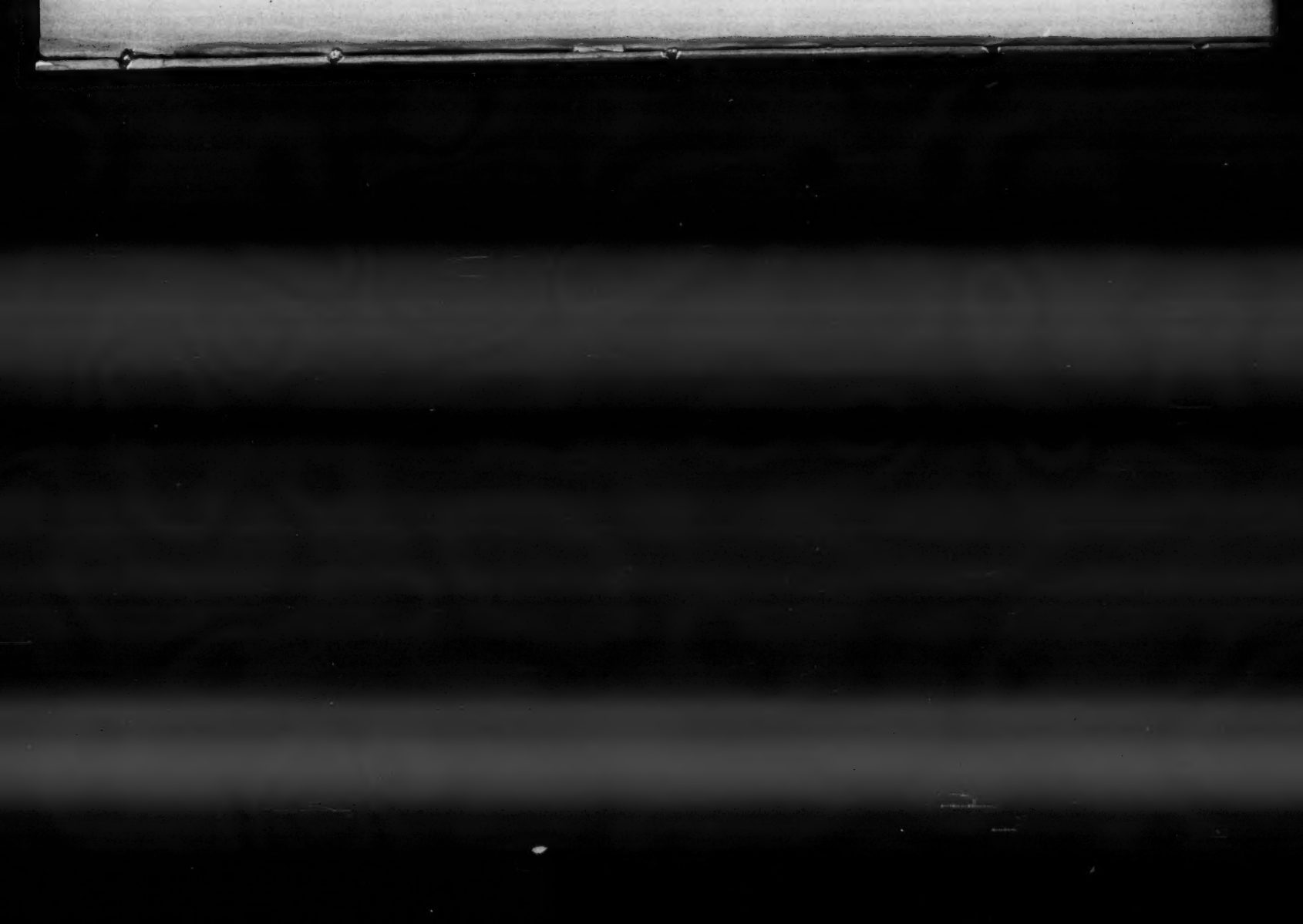
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